

Minnesota Department of Natural Resources



Date: July 7, 2014
To: Parties on the EAW Distribution List
Other Interested Parties

From: Jill Townley *J. Townley* Phone: 651-259-5168
Planner Principal

Subject: Upper Lightning Lake Water Level Management Project
Environmental Assessment Worksheet (EAW)

The Minnesota Department of Natural Resources (MDNR) has prepared the enclosed/attached Environmental Assessment Worksheet (EAW) to describe the environmental effects associated with the Upper Lightning Lake Water Level Management Project, located in Grant and Otter Tail Counties, Minnesota. This document has been prepared as a Mandatory EAW pursuant to Minnesota Rules, part 4410.4300, subpart 27 (Wetlands and Public Waters). The MDNR is the Responsible Governmental Unit for the environmental review of this project.

A 30-day public review and comment period will begin on July 7, 2014, with the publication of the notice of availability of this EAW in the EQB Monitor. The MDNR invites public comments on the EAW during the public review period from July 7, 2014 to August 6, 2014 at 4:30 pm. A copy of the EAW is available for public review at:

- DNR Library, 500 Lafayette Road, St. Paul.
- DNR Northwest Region, 2115 Birchmont Beach Rd NE, Bemidji, MN 56601.
- Minneapolis Central Library, Government Documents, 2nd Floor, 300 Nicollet Mall.
- Fergus Falls Public Library, 205 E Hampden Ave, Fergus Falls, MN 56537.
- Thorson Memorial Library, 117 Central Ave N, Elbow Lake, MN 56531.

The EAW is also posted on the DNR's website at: <http://www.dnr.state.mn.us/index.html> → Public Input → Environmental Review → See Upper Lightning Lake EAW in the drop down list.

Written comments must be received by Wednesday, August 6, 2014, at 4:30 pm and sent to:
Jill Townley, Planner Principal
Department of Natural Resources
Division of Ecological and Water Resources
500 Lafayette Road, St. Paul, Minnesota, 55155-4025

Electronic or e-mail comments may be sent to Environmentalrev.dnr@state.mn.us with "Upper Lightning Lake EAW" in the subject line. If submitting comments electronically, please include your name and U.S. mailing address. Signed written comments may be sent via facsimile to (651) 296-1811. For additional information, or copies of the EAW, please call (651) 259-5168.

Attachment: Upper Lightning Lake Water Level Management Project EAW

ENVIRONMENTAL ASSESSMENT WORKSHEET

Note to preparers: This form and EAW Guidelines are available at the Environmental Quality Board’s website at: <http://www.eqb.state.mn.us/EnvRevGuidanceDocuments.htm>.

The Environmental Assessment Worksheet provides information about a project that may have the potential for significant environmental effects. The EAW is prepared by the Responsible Governmental Unit or its agents to determine whether an Environmental Impact Statement should be prepared. The project proposer must supply any reasonably accessible data for — but should not complete — the final worksheet. The complete question as well as the answer must be included if the EAW is prepared electronically.

Note to reviewers: Comments must be submitted to the RGU during the 30-day comment period following notice of the EAW in the *EQB Monitor*. Comments should address the accuracy and completeness of information, potential impacts that warrant further investigation and the need for an EIS.

1. Project title: Upper Lightning Lake Water Level Management

2. Proposer: Minnesota Department of Natural Resources (MDNR)

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3. RGU: Minnesota Department of Natural Resources

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4. Reason for EAW preparation (check one)

EIS Scoping Mandatory EAW Citizen petition RGU discretion Proposer volunteered

A mandatory EAW is required, as stated in Minnesota Administrative Rules 4410.4300, Subp. 27, Wetlands and Public Waters: “For projects that will change or diminish the course, current, or cross-section of one acre or more of any public water or public water wetland except for those to be drained without a permit pursuant to Minnesota Statutes, chapter 103G, the local governmental unit shall be the RGU.”

5. Project location	County: Grant	City/Township: Lawrence
	Section: 1,11,12	Township 130N, Range 44W
GPS Coordinates	County: Otter Tail	City/Township: Western
	Section: 36	Township 131N, Range 44W
	N	W

Attach each of the following to the EAW:

- County map showing the general location of the project; (Figure 1)
- U.S. Geological Survey 7.5 minute, 1:24,000 scale map indicating project boundaries (photocopy acceptable); (Figure 2)
- Site plan showing all significant project and natural features.
 - Figure 3: Project Site Overview
 - Figure 4: 1991 Aerial
 - Figure 5: 2010 Aerial
 - Figure 6: Depth contours of Upper Lightning Lake
- Attachments to the EAW:
 - Attachment A: Preliminary Design Plans for the Downstream Channel
 - Attachment B: Preliminary Design Plans for the Structure and Upstream Channel
 - Attachment C: Existing Ground Profile
 - Attachment D: Design Report for Upper Lightning Lake
 - Attachment E: Draft Management Plan for Upper Lightning Lake
 - Attachment F: Minnesota State Historic Preservation Office correspondence

6. Description

a. Provide a project summary of 50 words or less to be published in the *EQB Monitor*.

The Minnesota Department of Natural Resources (MDNR), Section of Wildlife, proposes to install a pump and lift station at the outlet of Upper Lightning Lake to manage water levels for wildlife habitat and water quality improvement. As part of this project, the downstream public watercourse between Upper Lightning Lake and Denton Slough will be cleaned to restore flow between the water basins during pumping operations.

b. Give a complete description of the proposed project and related new construction. Attach additional sheets as necessary. Emphasize construction, operation methods and features that will cause physical manipulation of the environment or will produce wastes. Include modifications to existing equipment or industrial processes and significant demolition, removal or remodeling of existing structures. Indicate the timing and duration of construction activities.

Project Location

The project area includes Upper Lightning Lake (Division of Waters (DOW) # 56095700) and the downstream public watercourse that serves as the outlet to the lake (Figure 1). The proposed work area on Upper Lightning Lake and the 1,700 feet reach of the public watercourse between the lake and County Road 26 is located in Township 131N, Range 44W, Section 36 in Otter Tail County (Figure 2). This site is private land owned by two individuals; the DNR Section of Wildlife has purchased permanent easements on both properties to construct and maintain a water control structure and maintain the watercourse. The proposed clean-out of the watercourse continues downstream for 7,191 feet to open water on an

unnamed wetland basin (DOW#26036100) on the Kube-Swift Wildlife Management Area (WMA). The clean-out continues downstream from the wetland basin for an additional 3,490 feet to open water on Denton Slough (DOW#26030300). This reach of the public watercourse is located in Township 130N, Range 44W, Sections 1, 11, and 12 in Grant County (Figure 2). This site is a combination of private ownership (3 owners) and the Kube-Swift Wildlife Management Area. There are no easements with the private landowners in this part of the project area.

Earlier Project Designs and Background

Water level management on Upper Lightning Lake has been explored since the early 1990s. Project design proposals were completed in 1998 by MDNR engineering staff and in 2006 by Ducks Unlimited. Both proposals included significant modification/deepening of the downstream public watercourse to allow for drawdown on Upper Lightning Lake by gravity with a simple drop box water control structure. The Ducks Unlimited proposal included modifying the public watercourse into a two tier (stage) channel with a primary flow channel having a bottom width of 3.0 feet, 1:1 side slopes, and a depth of 3.0 feet. The bottom elevation of the primary flow channel would have ranged from 6.0 to 3.0 feet lower than the existing channel bottom in the reach between County Road 26 and the unnamed basin on the Kube-Swift WMA. This would have resulted in a relatively unnatural and unstable stream channel prone to incision and the modification of the public watercourse would have resulted in significant lateral drainage of the wetlands adjacent to the stream channel and triggered Wetland Conservation Act (WCA) and Swampbuster implications for the private landowners. This design alternative also required more excavation through the unnamed basin on the Kube-Swift WMA and the need for an additional water control structure on the outlet of this basin to maintain the established legal run-out elevation.

Proposed Project Design

Downstream Channel Clean-Out

Water flow through the public watercourse that connects Upper Lightning Lake to downstream Denton Slough has become restricted due to narrowleaf/hybrid cattail and sediment deposits. Water flow through this reach of the watercourse has become restricted. Aerial photos from 1991 (Figure 4) and 2010 (Figure 5) depicts the extent of the channel blockage. In addition, increased agricultural drainage in the watershed and above average precipitation have resulted in persistent high water levels on Upper Lightning Lake. Water levels have ranged from 1.5 to 5.0 feet above the Ordinary High Water Level (OHWL) since the mid-1980s. The normal structure and function of the public watercourse has also been affected by the continuous high water. Stream channels typically experience bankfull levels in two of every three years. On average, bankfull levels are exceeded and the floodplain is inundated for a period of two to three weeks. Anecdotal information and seasonal observations suggest the public watercourse has exceeded bankfull levels and accessed the floodplain 80-90 percent of the time over the last decade. This has created a permanent Type 3 wetland dominated by a monoculture of hybrid cattail within the floodplain of the stream. Cleaning the channel of cattail and sediment will restore the flow and hydrology between two shallow lake basins and enhance the potential for water level management to improve waterfowl habitat and water quality. A separate 3,800 feet section of the public watercourse was previously cleaned under a MDNR former Division of Waters permit in 1989 (Permit Number 88-1091).

The proposed channel clean-out of the public watercourse extends 10,681 feet downstream of County Road 26. The clean-out will consist of clearing a 6 foot wide, U-shaped channel of cattail and sediment down to the original grade of the watercourse with a front loading hydraulic excavator. The average bankfull depth of the channel will be 1.5 feet and the slope of the channel will average 0.1 percent. These channel dimensions are typical of a natural E-type stream channel in western Minnesota. E-type channels are typically slightly entrenched and exhibit a high level of sinuosity. In an undisturbed state, E-type channels contain a consistent series of riffle/pool reaches, resulting in more pool areas than other channel types. The course of the historical channel will be followed as closely as possible. The proposed channel plans are included in Attachment A (pages 4-13). The existing and proposed ground profiles of the channel are included in Attachment C. All excavated spoil will be hauled out of wetland areas to nearby designated upland sites in cultivated agricultural fields. These agricultural fields will be approved by the Natural Resource and Conservation Service as non- agricultural wetland areas and clearly staked for the contractor. Spoil will be blended into the existing field and leveled enough for disking. Any ruts/holes created next to the channel by the excavator will be leveled with the excavator or bulldozer. Any ruts caused by haul trucks will also be leveled. Depending on site conditions, low ground pressure track trucks or off-road trucks may be required to minimize disturbance. All disturbed areas within the existing cattail cover will be re-seeded with a wetland soil stabilization mix (Minnesota State Seed Mix 34-171 or equivalent) and covered with Minnesota Department of Transportation (MnDOT) Type 1 mulch. Disturbed areas within existing Conservation Reserve Program (CRP) grass buffers will be disked and re-seeded according to United States Department of Agriculture standards. All seeded areas will be checked for bare spots, washouts, vigorous plant growth, and free of significant weed infestations until the project area is stabilized. Future vegetation maintenance will be the responsibility of the individual private landowner.

Two field crossings in poor condition will also be replaced within this reach of the watercourse. The existing 36-inch corrugated metal pipe culverts will be replaced with 6 foot by 3 foot reinforced concrete box culverts. These culverts will match the channel width and will significantly reduce channel instability and erosion resulting from increased velocity through the existing 36-inch culverts. Field crossing #2 will be placed approximately 500 feet to the north of the existing culvert location to a narrower part of the watercourse and adjacent riparian wetland. This will reduce current wetland impacts caused by farm machinery crossing through the wider section of riparian wetlands (Attachment A, page 3). The need for wetland mitigation for the new crossing will be determined through the permit application process. The invert elevation of the new culvert at field crossing #1 will match the existing culvert. The invert elevation of the new culvert at field crossing #2 will be raised slightly to maintain the channel slope of 0.1 percent. The old metal culverts will be recycled, if possible, or hauled off-site for proper disposal

The channel cleanout/excavation throughout this section of the public watercourse is restorative in nature. The natural channel design and increased size of the culverts at the private field crossings will result in a more natural and stable stream channel and assure that floodplain dynamics are adequate to support hydrology of wetlands adjacent to the watercourse.

Water Control Structure and Inlet Channel

Since the existing outlet elevation of Upper Lightning Lake is not low enough to facilitate drawdowns to desired management elevations, the outlet area of Upper Lightning Lake must be modified to allow for a temporary drawdown. A pump and lift station was chosen to

minimize the alteration to the existing downstream watercourse. The lift station will consist of two 10' x 8' x 16.4' deep precast concrete boxes (Attachment B, pages 5-13). Each box would be fitted with a 10' x 10' concrete sloped end section facing upstream to collect inflow. The tops of the sloped end sections would be fitted with trash screens to prevent debris from entering the lift station. Each of the concrete boxes comprising the lift station would be equipped with a three-phase electrical submersible pump designed to pump up to 5,000 gallons per minute (gpm). The pumps would discharge into a precast 8' x 6' concrete box structure connected to the existing 24" concrete culvert under County Road 26. This structure would have removable stop logs to maintain the existing run-out elevation of 1084.19 (NAVD 88 datum) when the lake is not in drawdown.

The design report completed by Ducks Unlimited (Attachment D) has indicated that the channel morphology of the cleaned watercourse, new field crossings, existing road culverts, and the water control structure below Denton Slough can accommodate the flows generated from the two 5,000 gpm pumps [22.30 cubic feet per second (cfs)]. Actual pump output will be controlled by a Variable Frequency Drive control panel and be dependent on downstream water levels. The Project is designed to avoid increasing peak flows and volumes downstream following runoff events. Peak discharge flows from the project area are predicted to be nearly identical to the existing conditions (Attachment D - Design Report).

An embankment pad must be constructed adjacent to County Road 26 alongside the existing channel to accommodate the lift station and electrical control panel, as well as allow vehicle access to the structures off the county road. This embankment pad will cover 3,418 square feet or 0.08 acres. The concrete sloped end sections and rock rip rap armoring the embankment pad and intake structures will cover an additional 0.03 acres for a total wetland impact of 0.11 acres. This will require placing fill into public waters and will require replacement through wetland banking credits. Embankment material will be delivered to the project site, placed, and compacted within the structure area as detailed in the attached design plans (Attachment B). Topsoil will be placed and leveled on top of the fill. The area will be seeded with a Native Construction seed mix (Minnesota State Seed Mix 32-241 or equivalent). The seeded area will be checked for bare spots, washouts, vigorous plant growth, and free of significant weed infestations until the project area is stabilized. Future vegetation maintenance will be the responsibility of the MDNR Section of Wildlife and include annual mowing and spot herbicide treatment to manage noxious weeds.

The channel between the lake and the lift station will require modification to allow for pumping water levels from the normal run out elevation of 1084.19 down to the desired elevation of 1079.0. The new inlet channel from the sloped end section of the lift station will be 22 feet wide and extend 109 feet upstream. The inlet channel will then transition from 22 feet wide to a 6 foot wide channel over the next 75 feet. The 6 foot wide channel will then extend an additional 1,469 feet upstream to the lake bed. The inlet channel will be extended an additional 1,195 feet into the lake bed when water supply to the pump is not sufficient to maintain a minimum operating rate. The channel will have 2:1 side slopes and a bottom elevation of 1078.00. There will also be a side channel excavated alongside the lift station to flow water to the existing culvert during non-drawdown times. The channel will be 6 feet wide with 2:1 side slopes and have a bottom elevation of 1082.80. As with the downstream cleanout, all excavated spoil material will be hauled to nearby upland sites and blended into the existing non-wetland agricultural fields. Disturbed areas within the project site will be leveled and re-seeded as previously described in the Downstream Channel Clean Out section. Details of the inlet channel construction are provided in Attachment B (pages 1-4).

Timing and Duration of Construction Activities

The channel cleanout portion of the project is planned for the late fall/early winter of 2014. This is the time of year when water levels and flow in the watercourse are expected to be low and the adjacent ground may be frozen enough to allow an excavator to work without mats or other support. This is also the time of the year when construction would have the least impact on wetland dependent amphibians, reptiles, and birds. Work at this time would also avoid potential conflicts with adult or juvenile migrations (spawning or otherwise) and breeding behavior and success. Work would take place Monday through Friday, from 8:00 a.m. to 5:00 p.m. The cleanout will begin at the downstream end of the project area and work upstream towards Upper Lightning Lake. Rock rip rap check dams will be installed in the downstream reach to catch sediment as the front loading hydraulic excavator works upstream (Attachment A, page 4). The track excavator will dump the spoil directly into tracked or off-road trucks. Spoil will be hauled out of the project site and piled on approved non-wetland agricultural fields. Spoil will be leveled with a low ground pressure bulldozer suitable enough for a landowner to disk into the agricultural field as conditions allow. Depending on conditions, the channel excavation should be completed within two to three weeks.

Project construction will then be suspended while the restored channel allows Upper Lightning Lake to gradually recede about 2.0 feet down to the normal outlet elevation. Construction will resume in the summer of 2015 with the installation of the lift station and water control structure on the north side of County Road 26. This work would take place Monday through Friday, from 8:00 a.m. to 7:00 p.m. Construction equipment that may be used in the installation includes a truck-mounted crane, front loading hydraulic excavator, and skid-steer. The inlet channel will then be excavated to provide water to the lift station. As described for the downstream reach, the excavator will dump the spoil directly into off road trucks and haul it out of the project site. This work should be completed within three to four weeks.

The temporary drawdown of Upper Lightning Lake would begin after the inlet channel has been excavated to the lake. The drawdown would only proceed if downstream conditions could handle the additional water without causing flooding or damage as specified in Minnesota Rule, Chapter 6115. Drawdowns will also be coordinated with water level management on Denton Slough to provide additional downstream storage capacity. Pumps will be operated in a manner so that discharge does not exceed 25 cfs through the water control structure on Denton Slough. In addition, pumping will be controlled or stopped when the height of water in the watercourse exceeds 24 inches above the invert of the box culvert at the private crossing upstream of the Swift WMA.

Much of the drawdown could be completed prior to ice cover in order to avoid impacts to hibernating turtles and amphibians in Upper Lightning Lake. Further excavation into the lake down to an elevation of 1079.00 will take place as lower water levels on Upper Lightning Lake allow an excavator to work in the lake bed. Some of this later excavation may be done in winter and over ice cover on the lake.

The goal would be to lower the lake to an elevation of 1079.00 by the end of the winter of 2015 to facilitate a winter kill of the existing fish community. The lake would remain in drawdown for the following growing season to allow for consolidation of bottom sediments and the establishment of emergent vegetation. The basin would be allowed to start refilling during the fall of 2016. Drawdowns could not occur for longer than two years as limited in

Minnesota Rule (6115.0271, part C, item 4). Upper Lightning Lake will be maintained at a normal full pool elevation of 1084.19.

Erosion Control

All erosion control measures required by the Minnesota Pollution Control Agency Storm Water Pollution Protection Plan and MDNR Public Waters Permit will be installed and maintained including but not necessarily limited to; floating silt fence in public water basins, standard silt fence, 12 inch bio-rolls/straw wattles, and erosion control blankets. In addition, three temporary rock check dams will be installed at the lower end of the reach during the channel clean-out to slow water and catch downstream movement of silt. These rock check dams will be inspected regularly and sediment will be removed by the contractor when sediment depth reaches 75% of the height of the dam. The check dams will remain in place and be maintained until all disturbed areas within the project site are stabilized. Sediment and erosion control details are provided in Attachment A.

Invasive Species Prevention

The project site is currently dominated by narrowleaf/hybrid cattail (*Typha* spp.) and reed canary grass (*Phalaris arundinacea*). Dense stands of hybrid cattail can be a nuisance in wetlands, but are not considered a MDNR listed invasive species. Reed canary grass is listed as an invasive species, but is so widespread that control measures are generally limited to minimizing the risk of spreading the plant to uninfested areas. Future vegetation management within the project site will be the responsibility of the private landowner. Disturbed areas enrolled in the CRP within the project site will be restored to CRP cover standards by the MDNR Section of Wildlife.

No other aquatic or terrestrial invasive species have been documented in the project area. The high velocity fish barrier located downstream of the project site should prevent any aquatic invasive species from migrating into the project site, if they are currently present or become established in those downstream reaches.

The Contractor shall prevent invasive species from entering into or spreading within a project site by cleaning equipment and clothing prior to arriving at the project site. The Project Manager shall inspect all equipment and clothing at the staging area determined at the pre-construction meeting.

If the equipment or clothing arrives at the project site with soil, aggregate material, mulch, vegetation (including seeds) or animals, it shall be cleaned by Contractor furnished tool or equipment (brush/broom, compressed air or pressure washer) at the staging area. The Contractor shall dispose of material cleaned from equipment and clothing at a location determined by the Owner. If the material cannot be disposed of onsite, material will be secured prior to transport (sealed container, covered truck, or wrap with tarp) and legally dispose of offsite.

The Contractor shall clean equipment and clothing as noted above, prior to entering and leaving the water body. Prior to leaving the water body, water will be drained from all equipment, tanks or water retaining components of boats (motors, live well, and bilge). Immediately after leaving the water body, the Contractor shall drain water from transom wells onto dry land. All upland sites where the spoil will be spread are cultivated agricultural fields. Normal agricultural practices required to grow row crops, such as disking, plowing, and herbicide treatments, would minimize the survival and spread of invasive species.

c. Explain the project purpose; if the project will be carried out by a governmental unit, explain the need for the project and identify its beneficiaries.

Project Purpose

Upper Lightning Lake is a 720-acre basin located in southwest Otter Tail County that was traditionally known as an excellent waterfowl migration, staging, and breeding area. The lake supported an abundant and diverse submerged and emergent aquatic plant community which provided quality migratory and breeding habitat for waterfowl and other wetland wildlife. High water levels since the mid-1980s have resulted in a limited fish community dominated by a high density black bullhead population, poor water quality, significant loss of aquatic vegetation, severe bank erosion, and overall degradation of aquatic habitat. The MDNR Section of Wildlife is proposing to manage water levels on Upper Lightning Lake to improve wetland wildlife habitat and water quality. The management objectives are to restore water levels to the normal run-out elevation, encourage the growth and diversity of native aquatic vegetation, reduce the abundance of fish, and improve water clarity.

Need for the Project

Shallow lakes provide critical waterfowl and wetland wildlife habitat. Many of these lakes are in poor condition because of high water levels, increased nutrient levels, unbalanced fish populations (black bullhead population dominates Upper Lightning Lake), and greatly altered landscapes and hydrology. Recent concerns over significant declines in waterfowl abundance and waterfowl hunting success have renewed interest in the management of shallow lakes to improve waterfowl habitat and water quality.

MDNR's Long Range Duck Recovery Plan suggests that at least 1,800 shallow lakes will require protection and management to achieve desired targets set for the recovery of duck populations. The MDNR Section of Wildlife's Shallow Lakes Program Plan reiterates the goal of 1,800 managed shallow lakes with the focus on lakes associated with public lands managed for wildlife purposes, such as the 194-acre U.S. Fish and Wildlife Service (USFWS) Waterfowl Production Area on Upper Lightning Lake. These waterfowl production areas are managed to attract and produce migratory waterfowl, migratory non-game birds, and other resident wetland dependent wildlife. The USFWS Fergus Falls Wetland Management District supports the proposed project on Upper Lightning Lake.

The proposed project to restore shallow lake habitat and manage for a natural water regime is also consistent with management options stated in the State Wildlife Action Plan to better manage populations of "species of greatest conservation need" dependent on quality shallow lake habitat in Minnesota.

Improved ecological health of the lake and channel will benefit the surrounding plants and organisms, which are public resources. As such, beneficiaries of the proposed project will be the citizens of Minnesota. Additionally, nearby residents will benefit from flood damage reduction.

Project Goals

Cleaning and restoring the downstream channel will allow Upper Lightning Lake to outflow more effectively and return water levels down to the normal run-out elevation of the lake.

Lower lake levels will result in:

- A. An increase in coverage and density of emergent vegetation around the shoreline.

- B. Stabilization and re-vegetation of steep eroding banks.
- C. A reduction in flood damage to private property around the lake.

Installing a pump and lift station at the outlet of Upper Lightning Lake will allow the MDNR Section of Wildlife to conduct temporary drawdowns of the lake to improve waterfowl habitat and water clarity. Drawdowns are a common management tool for improving water quality and habitat conditions in shallow lakes. Temporary drawdowns on shallow lake basins enhance the abundance and diversity of aquatic vegetation. Bottom sediments hold a large, viable seed bank from the aquatic plants that the lake has supported in the past. The life history of most species of emergent aquatic vegetation requires a period of drying before seeds will germinate. Bottom sediments are consolidated and organic material is broken down during a drawdown, which can provide a more suitable substrate for a greater diversity of submerged aquatic plants. A temporary drawdown may also reduce or eliminate the existing fish community, which have negative impacts on aquatic vegetation and water clarity. Increased abundance of submerged aquatic plants and a reduction in fish abundance should also increase aquatic invertebrate abundance. An abundant and diverse aquatic plant community and increased numbers of invertebrates would provide quality habitat for migrating and breeding waterfowl. Specific goals for a temporary drawdown on Upper Lightning Lake include:

- A. Increased water clarity.
- B. Increase in submerged aquatic plant abundance and diversity.
- C. Increase coverage of emergent vegetation.

d. Are future stages of this development including development on any other property planned or likely to happen? Yes No

If yes, briefly describe future stages, relationship to present project, timeline and plans for environmental review.

e. Is this project a subsequent stage of an earlier project? Yes No

If yes, briefly describe the past development, timeline and any past environmental review.

A similar project was completed by the MDNR Section of Wildlife approximately 2.0 miles downstream on Denton Slough in the fall of 2011. The project involved the construction of a variable crest water control structure and cleanout of the downstream public watercourse. The objective of the project was to improve waterfowl habitat, improve water quality, and reduce flood damage to public roadways and private property. Denton Slough was completely dewatered by gravity during the 2012 growing season and allowed to return to the normal water level in 2013. Waterfowl habitat and water clarity were greatly improved on Denton Slough. There was also a high velocity fish barrier installed in the watercourse approximately 1.5 miles downstream of Denton Slough in 2007. The objective of the barrier is to prevent fish from migrating into upstream shallow lakes and wetlands following drawdowns and habitat restorations.

Review for the past projects included individual MDNR Public Waters Permits for the water control structure, clean out of the public watercourse, and the fish barrier. The Technical Evaluation Panel (TEP) for Grant County recommended a “No Loss” Wetland Conservation Act decision concerning wetland fill for the water control structure. There was also a review of any state-listed (endangered, threatened or special concern) species, rare plant communities or other sensitive ecological resources on or near the project sites.

7. Project magnitude data

Total project acreage 2.53 acres

Number of residential units: unattached: 0 attached: 0 maximum units per building
 Commercial, industrial or institutional building area (gross floor space): total square feet

Indicate areas of specific uses (in square feet):

Office 0	Manufacturing 0
Retail 0	Other industrial 0
Warehouse 0	Institutional 0
Light industrial 0	Agricultural 0

Other commercial (specify) 0

Building height NA If over 2 stories, compare to heights of nearby buildings

8. Permits and approvals required. List all known local, state and federal permits, approvals and financial assistance for the project. Include modifications of any existing permits, governmental review of plans and all direct and indirect forms of public financial assistance including bond guarantees, Tax Increment Financing and infrastructure. *All of these final decisions are prohibited until all appropriate environmental review has been completed. See Minnesota Rules, Chapter 4410.3100.*

<u>Unit of government</u>	<u>Type of application</u>	<u>Status</u>
MDNR	Public Waters Work Permit	Application to be submitted
MDNR	Waters General Permit 2011-0616	Valid upon Wildlife Lake designation
MDNR	Wetland Conservation Act	Pending "No Loss"
MPCA	NPDES General Construction Stormwater Permit	Application to be submitted by contractor.
MPCA	401 Certification	TBD
U.S. Army Corps of Engineers	Clean Water Act Section 404	Application to be submitted
Bois de Sioux WD	Design plan review	Review pending

9. Land use. Describe current and recent past land use and development on the site and on adjacent lands. Discuss project compatibility with adjacent and nearby land uses. Indicate whether any potential conflicts involve environmental matters. Identify any potential environmental hazards due to past site uses, such as soil contamination or abandoned storage tanks, or proximity to nearby hazardous liquid or gas pipelines.

Project Site

The footprint of the proposed project lies within the bed of a public watercourse and the bed of a public water basin. These waters are located in the Rabbit River watershed in southwest Otter Tail and northwest Grant counties. Historic aerial photos suggest that this watercourse was intermittent in past years, but has become more permanent in recent years with above area precipitation and blockage by hybrid cattail and their associated root mass. There is no known recreational use of the public watercourse.

Upper Lightning Lake (DOW# 56095700) is a 720-acre shallow lake. It was traditionally known as an excellent waterfowl migration, feeding, staging, and breeding area. The lake supported an abundant and diverse aquatic plant community. At present, wetland wildlife habitat conditions are poor. Aquatic plant abundance and diversity is limited and water quality is considered impaired. The lake still attracts some migratory waterfowl which are likely staging on the lake and feeding in nearby agricultural fields. There is still some fall

waterfowl hunting pressure on the lake, however there is no history of recreational boating or fishing.

Adjacent Lands

The land adjacent to the project site is primarily wetlands and agricultural fields. Past land use was more agricultural, especially during dry periods. However, the immediate adjacent land has been partially flooded and inhabited by a dense stand of hybrid cattail over the past 25 years. These areas have been enrolled in the CRP and are no longer row cropped. Grant County enforces a 50-foot wide buffer zone of natural vegetation on each side of a public watercourse. Otter Tail County is currently taking steps to effectively monitor and enforce the 50-foot buffer zone requirement. The maintenance of this minimum 50-foot buffer will also be a condition of the General Waters Permit. Thus there is strong financial incentive for the private landowner to keep this riparian zone in the CRP. Continued CRP enrollment of land outside of the required 50 feet buffer zone will be more dependent on current agricultural markets, status of the CRP and availability, and many other factors other than the potential change in hydrology resulting from the channel restoration.

10. Cover types. Estimate the acreage of the site with each of the following cover types before and after development:

	Before	After		Before	After
Types 1-8 Wetland	2.53	2.42	Lawn/Landscaping	0	0
Wooded/forest	0	0	Impervious Surface	0	0.11
Brush/Grassland	0	0	Stormwater Pond	0	0
Cropland	0	0	Stream	0	0
			TOTAL	2.53	2.53

If **Before** and **After** totals are not equal, explain why:

The fill needed to create the embankment pad, lift station, and rock armoring will result in the direct loss of 0.11 acres of wetlands. This 0.11 acres includes both public wetlands and WCA administered wetlands. The Otter Tail TEP agreed to allow the replacement of those 0.11 acres from an established MDNR wetland bank account from Benton County at the required ratio.

Wetland impacts and mitigation under the WCA have been discussed with TEPs from both Grant and Otter Tail counties. The Grant County TEP concurred that the channel excavation in Grant County would be done in a public watercourse (Kittle Number H-26-085-017-001-0010) under a Public Waters Permit. The proposed project would not change any existing culvert elevations or original grade of the watercourse; therefore, it is considered maintenance and would not drain WCA administered wetlands. All material excavated will be hauled out of the project site and spread on agricultural fields that have been approved as non-wetlands. The TEP panel concluded there was no WCA jurisdiction or need for a formal decision for the downstream channel clean out in Grant County.

The significant excavation and modification of the same public watercourse in Otter Tail County would have the potential for lateral drainage of adjacent wetland areas. However, the proposed project includes a variable crest water control structure, thus water levels in the lake

and in the wetland area between the lake and County Road 26 can be maintained at the normal established run out elevation when the lake is not in drawdown status. The TEP from Otter Tail County agreed that there would be no wetland loss associated with the modification of the public watercourse.

11. Fish, wildlife and ecologically sensitive resources

a. Identify fish and wildlife resources and habitats on or near the site and describe how they would be affected by the project. Describe any measures to be taken to minimize or avoid impacts.

Fisheries Resources and Habitat

There have been no formal fisheries, macroinvertebrate, or stream habitat assessments of the public watercourse in the project area. The stream channel is filled with hybrid cattail and provides little, if any, typical stream habitat features. Fathead minnows have been observed in the channel near the culvert under County Highway 26. A high velocity culvert was installed about 4 miles downstream in 2007 to restrict the movement of fish into wetland basins and shallow lakes in this catchment area. A fisheries assessment completed on Upper Lightning Lake in 2013 found a limited fish community, dominated by a high density black bullhead population. There are no reports of recreational fishing on Upper Lightning Lake.

Wildlife Resources and Habitat

The public watercourse and nearby adjacent land is primarily a dense monoculture of hybrid/narrow leaf cattail. These tall, dense stands of cattail are generally considered poor habitat for waterfowl and other wetland wildlife that prefer semi-open marsh areas. There have been no formal wildlife assessments in the project area along the public watercourse. At present, this area is shallow marsh wetland habitat and likely supports typical wetland dependent species. The channel excavation is scheduled for late fall/winter when construction would have the least/no impact on wetland dependent amphibians, reptiles, and birds.

Upper Lightning Lake was traditionally known as an excellent waterfowl migration, staging, and breeding area. Large concentrations of dabbling and diving ducks historically used the lake according to local residents and past game lake surveys. In addition, the lake provided breeding habitat for furbearers and other wetland wildlife species. Past game lake surveys indicate the lake supported an abundant and diverse aquatic plant community, including dense beds of sago pondweed and large stands of hardstem bulrush. Local residents and MDNR wildlife staff noted a degradation of this basin in the mid-1980s. Presently, high water levels have resulted in a limited fish community dominated by a high density black bullhead population, poor water quality, and reduced abundance of emergent and submerged vegetation. Waterfowl observed during recent wildlife lake surveys included limited numbers of mallards, blue-wing teal and Canada Geese. Wood duck numbers have been highly variable, ranging from none observed in 2002 to over 1,100 observed in 2005. There would be no conflict with adult or juvenile bird migrations and breeding behavior and success would not be affected. The project area may provide over-wintering habitat for white tail deer and ring-necked pheasant. These species may be temporarily disturbed by large equipment operating in the area, but impact will be minimal.

There was no formal information on the amphibian and reptile (i.e., herpetofaunal, or herps) collection, but we can assume that turtles, frogs, salamanders, may be present and would be impacted by the fill, construction and major excavation within a wetland area. One-time

impacts to juvenile and adult stages of these species as well as other wetland dependent wildlife are expected. Construction is slated to begin in summer of 2015. By starting construction during this period, most of the indirect losses may be mitigated because construction timing would avoid the spring breeding season for wildlife and the late summer/fall when herps are seeking overwintering sites.

After the completion of the control structure and inlet channel, the drawdown would begin via pumping. The goal would be to get levels down to about 2-3 feet max depth prior to ice up. Pumping through the winter may be considered, but is highly dependent on weather and downstream ice conditions. With less water in the lake, oxygen may become limited in the winter, which may result in winter kill of herps, fish, and invertebrates. However, it is expected that these species would have sought overwintering habitat, given that the lake had already experienced drawdown in fall.

When triggers are met, periodic drawdowns will be necessary as described in the Upper Lightning Lake Management Plan (Attachment E). These periodic drawdowns will ideally be timed to begin mid/late summer so herps select more suitable overwintering habitat and the spring breeding season (for herps and other wildlife) is avoided. Timing these drawdowns can be challenging because they can be difficult to manage for optimum wildlife enhancement and negative impacts given the highly modified landscape and hydrology, downstream conveyance issues, and riparian landowner issues. Timing of construction will be optimized to limit impacts to wildlife while still achieving the goals of the project.

From construction through the first major drawdown, direct losses, overwintering losses and temporary loss of habitat for breeding for herps and other wildlife are expected. Although there will be impacts to herps and other wildlife during construction and occasionally during periodic drawdowns, the improvement and management of over 600 acres of shallow lake wetland habitat would be an overall benefit. The goal is to improve and manage wetland habitat on a much degraded, altered system. The exclusion of fish will benefit breeding amphibians.

b. Are any state-listed (endangered, threatened or special concern) species, rare plant communities or other sensitive ecological resources on or near the site? Yes No
If yes, describe the resource and how it would be affected by the project. Describe any measures that will be taken to minimize or avoid adverse impacts. Provide the license agreement number (LA-___) and/or Division of Ecological Resources contact number (ERDB 20130335) from which the data were obtained and attach the response letter from the MDNR Division of Ecological Resources. Indicate if any additional survey work has been conducted within the site and describe the results.

The MDNR Natural Heritage Information System (NHIS) Rare Features Database was checked on February 8, 2014. The query did not identify state-listed endangered, threatened, or special concern species within the downstream channel project area. The nearest record is a prairie chicken (special concern) in 2004 on upland approximately 0.8 miles from the most western portion of the channel work. There are also records of American bittern and loggerhead shrike (endangered) approximately 0.8 miles from the most southern reach of the channel cleanout on an unnamed wetland basin on the Kube-Swift WMA in 1980. American bitterns have a diverse diet, including fish, frogs, salamanders, aquatic invertebrates, and even small mammals. This species should benefit from a drawdown through an improvement in nesting habitat and an increase in food availability, with the exception of fish. Negative

impacts to the loggerhead shrike, the American bittern, and the prairie chicken are not anticipated.

There is also a record of Colonial Waterbird Nesting Site on Upper Lightning Lake in 1983. Western grebe and red-necked grebe were both listed in that record. MDNR non-game wildlife data include records of western grebes observed in 1987 and 1990 on Upper Lightning Lake. Two active western grebe nests were recorded in 1991. There are no other sightings or records of monitoring after 1991. The observations of grebes and nesting on Upper Lightning Lake were recorded at a time when the lake supported large stands of hardstem bulrush along shore and in open water areas. This emergent vegetation disappeared during the mid-1990s and it is unlikely and not documented that grebes currently use the lake for nesting. The proposed project will increase the abundance of emergent vegetation and restore colonial waterbird nesting habitat following the drawdown. Redneck grebes and western grebes both rely on fish, which will be significantly reduced in abundance, as the main part of their diets. However, there are many nearby lakes that could provide suitable breeding habitat. These species may return to improved nesting habitat on Upper Lightning Lake to breed if fish populations develop in the years following the drawdown.

- 12. Physical impacts on water resources.** Will the project involve the physical or hydrologic alteration — dredging, filling, stream diversion, outfall structure, diking, and impoundment — of any surface waters such as a lake, pond, wetland, stream or drainage ditch? Yes
 No

If yes, identify water resource affected and give the DNR Public Waters Inventory number(s) if the water resources affected are on the PWI: Describe alternatives considered and proposed mitigation measures to minimize impacts.

The project area is directly within the channel of an unnamed public watercourse (Kittle Number H-026-085-017-001-0010) and the bed of Upper Lightning Lake (DOW# 56095700). The goal of the project is to improve waterfowl habitat and water quality on Upper Lightning Lake by lowering the lake to normal levels and conducting a temporary drawdown to stimulate the growth of aquatic vegetation and eliminate the existing fish community. The project was designed to minimize adverse effects to existing water resources. Other project design alternatives considered had a much greater impact to the downstream watercourse and adjacent wetland areas are described in Item 6. Specific erosion control measures and invasive species control measures to protect water resources are also described in Item 6. The historic channel of the watercourse that serves as the outlet of the lake has become filled with hybrid cattail and some minor sediment deposition. These obstructions are restricting flow through the channel. In addition, increased agricultural drainage within the watershed and an above average precipitation pattern have resulted in permanent high water conditions on Upper Lightning Lake as well as within the flood plain of the watercourse. The project is designed to restore flow through the watercourse by removing cattail and minor sediment deposits from a 6 foot wide, U-shaped channel from County Road 26 downstream to Denton Slough. The average bankfull depth of the channel will be 1.5 feet and the slope of the channel will average .001. These channel dimensions are typical of a natural E-type stream channel in western Minnesota. The length of the channel clean out is approximately 10, 680 feet. A TEP in Grant County reviewed the proposed cleanout of the watercourse and determined that the work would not change the existing culvert invert elevations or the natural grade of the watercourse; therefore, it would be considered maintenance and would not drain WCA administered wetlands. The proposed project may change the wetland type in the area adjacent to the channel, but would not result

in a loss of wetlands in the project area. The existing Type 3 permanent wetland dominated by a monoculture of hybrid cattail may revert back to Type 1 or Type 2 seasonal wetlands within the flood plain that occurred prior to the channel blockage. These seasonal wetlands were intensively farmed in the past, when conditions allowed, but are now enrolled in the Conservation Reserve Program. The Grant County Shoreland Ordinance requires a 50-foot buffer of natural vegetation be maintained along the public watercourse, thus there is a strong economic incentive to for the private landowners to keep at least the 50-foot buffer enrolled in the Conservation Reserve Program.

The proposed project also includes the installation of a pump and lift station adjacent to the public watercourse on the north side of County Road 26 to facilitate temporary drawdowns on Upper Lightning Lake. An embankment pad must be constructed in wetlands alongside the existing channel to accommodate the lift station and electrical control panel, as well as allow vehicle access to the structures off the county road. This embankment pad will cover 3,418 square feet or 0.08 acres. An additional area covering 1,453 square feet (0.03 acres) of rock rip rap will also be added to the wetland area to armor the embankment pad and intake structures. This will require placing fill into public waters and will result in a net loss of 0.11 acres of wetlands. This will be replaced at the required ratio through wetland banking credits.

The outlet area between Upper Lightning Lake and the lift station will require modification to allow for pumping water levels down to the desired elevation of 1079.0. The modified inlet channel from the sloped end section of the lift station will be 22 feet wide and extend 109 feet upstream. The inlet channel will then transition from 22 feet wide to a 6 foot wide channel over the next 75 feet. The 6 foot wide channel will extend an additional 1,469 feet upstream to the lake bed. The inlet channel will be extended up to an additional 1,195 feet into the lake bed when water supply to the pump is insufficient to maintain a minimum operating rate. The channel will have 2:1 side slopes and a bottom elevation of 1078.00. There will also be a side channel excavated alongside the lift station to flow water to the existing culvert during non-drawdown times. The channel will be 6' wide with 2:1 side slopes and have a bottom elevation of 1082.80. As with the downstream cleanout, all excavated spoil material will be hauled to nearby upland sites and blended into the existing agricultural fields. This modification of the public watercourse between Upper Lightning Lake and County Road 26 would result in a lateral drainage effect on the adjacent wetland areas. However, the proposed project includes a variable crest water control structure located just upstream of County Road 26 that will maintain water levels in the lake, watercourse, and adjacent wetlands at the established normal run out elevation of 1084.19 when the lake is not in drawdown. The Otter Tail County TEP reviewed the proposed design plans and agreed that there would be no loss of wetlands associated with the channel modification.

Additional information on proposed mitigation measures to minimize impacts is referenced in Item 6 (above).

- 13. Water use.** Will the project involve installation or abandonment of any water wells, connection to or changes in any public water supply or appropriation of any ground or surface water (including dewatering)? Yes No
If yes, as applicable, give location and purpose of any new wells; public supply affected, changes to be made, and water quantities to be used; the source, duration, quantity and purpose of any appropriations; and unique well numbers and MDNR appropriation permit numbers, if known. Identify any existing and new wells on the site map. If there are no wells

known on site, explain methodology used to determine.

Existing Permits

There are two existing surface water appropriation permits (1971-0237, 1971-0038) for crop irrigation located on the north side of Upper Lightning Lake. The permit holder has kept these permits active by paying a minimum annual fee, however has not reported any water use since 1990. The exact locations of the intake structures, if still in existence, are unknown. The agricultural land listed on the appropriation permits is located on the north end of the lake in close proximity to the deepest contours. This area will still be approximately 2-3 feet deep and hold approximately 158 acre-feet of water during the fullest extent of any proposed drawdown. The maximum total allowance for both permits is 143 acre-feet per calendar year. The MDNR Section of Wildlife would work with the landowner to extend the intake structures to suitable depths in the unlikely case that the landowner decides to appropriate water during the drawdown period.

- 14. Water-related land use management district.** Does any part of the project involve a shoreland zoning district, a delineated 100-year flood plain, or a state or federally designated wild or scenic river land use district? Yes No
If yes, identify the district and discuss project compatibility with district land use restrictions.

Grant County Shoreland Management Zone

The project site within Grant County is all below the OHWL of the watercourse and wetland basin, thus under the jurisdiction of the MDNR. Grant County typically defers permit authority for grade/fill permits in the shoreland zone to the MDNR for public watercourse cleanouts. The excavation is scheduled for the late fall/early winter of 2014. Excavated material may be placed in temporary spoil piles on agricultural land within the shore management zone, and leveled suitable enough for disking into the cultivated field as conditions allow. Efforts will be made to minimize the footprint of temporary spoil piles and equipment tracks within the shore management zone. All disturbed areas within the existing cattail cover will be re-seeded with a wetland soil stabilization mix (Minnesota State Seed Mix 34-171 or equivalent) and covered with MnDOT Type 1 mulch. A 50 foot wide buffer of natural vegetation will be enrolled in the CRP and maintained along the watercourse as required by the Grant County Shoreland Ordinance and included as a condition of MDNR General Waters Permits issued in Grant County. There is strong financial incentive for the private landowner to keep this riparian zone in the CRP.

Otter Tail County Shoreland Management Zone

All excavation proposed in Otter Tail County is below the OHWL of Upper Lightning Lake, thus under the jurisdiction of the MDNR. The excavation is scheduled for the summer/fall of 2015. Excavated material may be placed in temporary spoil piles on agricultural lands within the shore management zone, and leveled suitable enough for disking into the cultivated field as conditions allow. Efforts will be made to minimize the footprint of temporary spoil piles and equipment tracks within the shore management zone. All disturbed areas within the existing cattail cover will be re-seeded with a wetland soil stabilization mix (Minnesota State Seed Mix 34-171 or equivalent) and covered with MnDOT Type 1 mulch. A 50 foot wide buffer of permanent vegetation will be maintained along the watercourse as required by Otter Tail County Shoreland Ordinance.

Portions of the embankment pad for the pump and lift station will be above the OHWL and encroach on the shore impact zone. The construction of the pad would require a Grade/Fill

Permit. However, the land is controlled by the State of Minnesota through a perpetual easement, thus the State is not mandated to obtain permits from local units of government per Minnesota Statute 394.24, subd3. It is MDNR policy to inform the county of the project and comply with all conditions and performance standards of a typical permit.

15. Water surface use. Will the project change the number or type of watercraft on any water body? Yes No

If yes, indicate the current and projected watercraft usage and discuss any potential overcrowding or conflicts with other uses.

At present, there is no watercraft usage on the public watercourse. There are no anticipated changes to usage following the project. There is limited watercraft use on Upper Lightning Lake during waterfowl season. There may be a slight increase in watercraft use during waterfowl season on Upper Lightning Lake following the project and anticipated improvements to waterfowl habitat and waterfowl use. There is no developed access, however hunters may carry in or drag small boats or canoes from a parking area on the USFWS Waterfowl Production Area on the southeast side of the lake. The slight increase in small watercraft use will not cause recreational conflicts or have adverse effects on the improved aquatic habitat.

16. Erosion and sedimentation. Give the acreage to be graded or excavated and the cubic yards of soil to be moved: **2.42** acres; **13,101** cubic yards. Describe any steep slopes or highly erodible soils and identify them on the site map. Describe any erosion and sedimentation control measures to be used during and after project construction.

There are no steep slopes or highly erodible soils in the proposed excavation areas. Soil types are dominated by clay and silt loam in the project area and the topography is relatively flat. Excavated material is the only source for potential sedimentation. All material will be hauled off site and spread on cultivated agricultural fields. Standard silt fence will be installed around the perimeter of spoil areas until they are planted with an agricultural crop. Any temporary spoil piles in the project area will be protected from erosion by installing silt fence around the entire perimeter of the stockpile.

Three temporary rock rip rap check dams will be installed on the downstream end of the channel clean out to capture sediment that would be transported downstream during excavation. Sediment will be monitored and removed by the contractor when the depth exceeds 75% of the height of the dams. Sediment removed will be spread on designated spoil areas. The check dams will remain in place until the project manager determines that all disturbed areas within the Downstream Channel Cleanout project site have been stabilized.

The contractor is responsible for implementation of the SWPPP and installation, inspection, and maintenance of the erosion prevention and sediment control BMPs before and during construction. The contractor will be required to have a person designated and on the project site that has been trained and certified as either an Erosion/Sediment Control Inspector/Installer or in Erosion/Sediment Control Site Management.

17. Water quality: surface water runoff

a. Compare the quantity and quality of site runoff before and after the project. Describe permanent controls to manage or treat runoff. Describe any stormwater pollution prevention plans.

The quantity and quality of surface water run-off from the project site will be relatively unchanged. There will only be a minor (0.11 acre) change in land use and cover type. The watercourse will have a temporary increase in sediment load during excavation of the channel. However, three rock rip rap check dams will be installed within the channel on the downstream end of the project area to capture suspended silt and sediment from the excavation activities. Temporary sediment impacts within the watercourse should not affect water quality downstream of Denton Slough. Proper erosion and sediment control measures will be implemented on all exposed soil and temporary spoil piles as prescribed in the SWPP referenced in Item 16.

Pumping operations during the drawdown cycle on Upper Lightning Lake will result in increased flows and a temporary increase in sediment load within the outlet channel. The pump discharge is directed into a concrete box culvert which will reduce the erosion potential of the moving water and settle some of the suspended silt. The temporary sediment impacts are generally localized to the immediate area downstream from the pump discharge and will be removed, as needed, from the watercourse. Pumping will normally occur in the late summer and fall when base flows are relatively low and will be managed to not cause downstream flooding or erosion. Grant County Ditch #5 is highly modified and capable of handling flows from the proposed project. The bankfull width averages over 26 feet and the cross-sectional area exceeds 73 square feet.

b. Identify routes and receiving water bodies for runoff from the site; include major downstream water bodies as well as the immediate receiving waters. Estimate impact runoff on the quality of receiving waters.

Water Quality Implications – Downstream

The project site includes the public watercourse that is the outlet for Upper Lightning Lake and flows south for 1.5 miles until it enters an unnamed wetland basin (26036100) on the Kube-Swift WMA. Water flows west out of this wetland basin for 0.5 miles until it enters Denton Slough (26030300) which is a Designated Wildlife Lake. Water levels can be managed on Denton Slough to improve wildlife habitat with a variable crest control structure located just downstream of the outlet. Water then flows south and southeast for about 2.0 miles until it turns west and flows through a high velocity fish barrier culvert under 300th Ave. and empties into Grant County Ditch #5. The ditch flows west for 4.0 miles into it enters Judicial Ditch #2, which flows north for about 2.0 miles until it enters the Rabbit River. This reach of the Rabbit River is listed on the 303(d) Impaired Waters List for fish IBI, macroinvertebrate IBI, turbidity, and dissolved oxygen.

This downstream reach is included in a Watershed Restoration and Protection Strategy (WRAPS), which is currently being developed on the Bois de Sioux River watershed. Phase I (Monitoring and Assessment) to document the health of the watershed is scheduled to be completed in 2014. Phase I includes compiling and evaluating existing data, as well as conducting additional biological and watershed modeling. The development of watershed and restoration strategies is scheduled for 2015-2016 and implementation activities are scheduled for 2016-2021.

Water quality data from the watercourse within the project site and immediate downstream reach is limited. One site on Grant County Ditch #5 was monitored by the Minnesota Pollution Control Agency (MPCA) for biological integrity in 2010, as part of the Bois de

Sioux River watershed monitoring and assessment study. Chemical parameters from that site are listed in the table below:

Total Phosphorus (mg/l)	Total Kjeldahl Nitrogen (mg/l)	Total Suspended Solids (mg/l)
0.27	0.42	24.4

The MPCA report also showed that fish Index of Biological Integrity (IBI) scores and macroinvertebrate IBI scores were poor at all seven biological monitoring stations in the Rabbit River sub-watershed. Poor scores were attributed to low dissolved oxygen and high turbidity. Physical stream habitat indices were also rated as poor at all monitoring stations.

The proposed project will have no negative impact on downstream reaches. Sediment and erosion control measures and natural wetland basins will limit the downstream movement of silt and sediment associated with excavation or pumping discharges. The recent dramatic aquatic habitat and water quality improvements on Denton Slough may result in lower turbidity immediately downstream of the project site.

Water Quality Implications – Upper Lightning Lake

The main objectives of the project are to improve waterfowl habitat and water quality on Upper Lightning Lake. The lake has been in poor condition for many years because of high water, unbalanced fish populations (black bullhead population dominates), and elevated nutrient levels. Water quality indices indicate the lake exceeds the eutrophication standard and is considered to not support recreational use. Upper Lightning Lake was recently added to the 303(d) Impaired Waters List in 2014. There are several years of water quality data from Upper Lightning Lake, including five samples per summer in 2009 and 2010. Mean concentrations of measured parameters in those years are listed in the table below:

Year	Chl a (ug/l)	TP (ug/l)	TKN (mg/l)	TSS (mg/l)	Secchi (m)
2009	39.9	105	1.86	11.5	0.84
2010	36.6	96	1.68	9.8	0.96

Nutrient availability in shallow lakes is different than that of deep, stratified lakes. Constant mixing and sediment–water contact results in high nutrient availability in the water column. Fish populations are also known to have a strong influence on water quality in shallow lakes by increasing internal nutrient cycling and limiting zooplankton populations. Basins that support an unbalanced fish community dominated by benthivorous and planktivorous fish tend to have dense algal populations and high nutrient concentrations that result in turbid water and limited aquatic vegetation. These factors result in strong internal nutrient loading in shallow lakes.

Water level management on shallow lakes is a widely accepted and proven tool to improve wetland habitat and water quality. It has been demonstrated that elimination or significant reduction in fish biomass can switch a lake from the turbid state dominated by nuisance algae to a clear state dominated by submerged aquatic vegetation. Implementation strategies included in the Bois de Sioux River Watershed WRAP will likely include drawdowns on Upper Lightning Lake, as well as Ash Lake and Denton Slough to improve water quality in those basins and the watershed. Any temporary water quality impacts in the downstream watercourse due to project construction or operation should be mitigated by significant improvements to water quality on Upper Lightning Lake.

An additional benefit of the proposed project is the reduction of flood damage and erosion to the shoreline around Upper Lightning Lake. Years of persistent high water levels have resulted in severe bank erosion which has added a significant amount of sediment to the lake. High water levels have also impacted riparian landowners who have endured flooding, loss of shoreline property, and the loss mature trees along the shoreline.

18. Water quality: wastewaters

a. Describe sources, composition and quantities of all sanitary, municipal and industrial wastewater produced or treated at the site.

There are no existing or planned sanitary, municipal, or industrial wastewater sources in the project area.

b. Describe waste treatment methods or pollution prevention efforts and give estimates of composition after treatment. Identify receiving waters, including major downstream water bodies (identifying any impaired waters), and estimate the discharge impact on the quality of receiving waters. If the project involves on-site sewage systems, discuss the suitability of site conditions for such systems.

Not applicable.

c. If wastes will be discharged into a publicly owned treatment facility, identify the facility, describe any pretreatment provisions and discuss the facility's ability to handle the volume and composition of wastes, identifying any improvements necessary.

Not applicable.

19. Geologic hazards and soil conditions

a. Approximate depth (in feet) to ground water: 10 feet minimum; 15 feet average; to bedrock: minimum 200 feet average.

Describe any of the following geologic site hazards to ground water and also identify them on the site map: sinkholes, shallow limestone formations or karst conditions. Describe measures to avoid or minimize environmental problems due to any of these hazards.

There is no karst geology in the area. Approximately 200 feet of glacial till and outwash cover the bedrock in this section of Otter Tail and Grant counties.

b. Describe the soils on the site, giving NRCS (SCS) classifications, if known. Discuss soil texture and potential for groundwater contamination from wastes or chemicals spread or spilled onto the soils. Discuss any mitigation measures to prevent such contamination.

The soils in the project site are poorly drained, hydric soils classified as silty clay loam in the Formdale-Langhei-Aazddahl Association. These soil types are not susceptible to groundwater contamination from surface spills.

20. Solid wastes, hazardous wastes, storage tanks

a. Describe types, amounts and compositions of solid or hazardous wastes, including solid animal manure, sludge and ash, produced during construction and operation. Identify method and location of disposal. For projects generating municipal solid waste, indicate if there is a

source separation plan; describe how the project will be modified for recycling. If hazardous waste is generated, indicate if there is a hazardous waste minimization plan and routine hazardous waste reduction assessments.

There will be no sludge, animal waste, ash, or other hazardous waste produced during the construction or operation of the proposed project.

b. Identify any toxic or hazardous materials to be used or present at the site and identify measures to be used to prevent them from contaminating groundwater. If the use of toxic or hazardous materials will lead to a regulated waste, discharge or emission, discuss any alternatives considered to minimize or eliminate the waste, discharge or emission.

The only toxic or hazardous materials to be used or present at the project site are fuel, oil, and hydraulic fluid within the construction equipment and machinery. Refueling will be done away from the project site and equipment will be inspected and maintained to prevent accidental loss of hazardous fluids. Spill notification procedures are listed in the SWPPP (in the design plan attachments); however there is no spill management plan in place. Fuels will not be stored in the project site and refueling must be done outside of the project site.

c. Indicate the number, location, size and use of any above or below ground tanks to store petroleum products or other materials, except water. Describe any emergency response containment plans.

None.

21. Traffic. Parking spaces added: 1

Existing spaces (if project involves expansion): 0

Estimated total average daily traffic generated: 0

Estimated maximum peak hour traffic generated and time of occurrence: 0

Indicate source of trip generation rates used in the estimates.

If the peak hour traffic generated exceeds 250 vehicles or the total daily trips exceeds 2,500, a traffic impact study must be prepared as part of the EAW. Using the format and procedures described in the Minnesota Department of Transportation's Traffic Impact Study Guidance (available at: <http://www.oim.dot.state.mn.us/access/pdfs/Chapter%205.pdf>) or a similar local guidance, provide an estimate of the impact on traffic congestion on affected roads and describe any traffic improvements necessary. The analysis must discuss the project's impact on the regional transportation system.

There will be one parking space added on the embankment pad to access the lift station, control structure, and electrical control panel. There will be no long term impact on traffic in the area. There will a short term, minimal increase in heavy duty truck traffic during construction. Trucks will be hauling equipment and workers to the site and hauling spoil to nearby agricultural fields. Access sites to the project area from public roads are identified in the attached design plans (Attachment A and B). Access sites were chosen to minimize the footprint of trails through wetland areas in the project site.

22. Vehicle-related air emissions. Estimate the effect of the project's traffic generation on air quality, including carbon monoxide levels. Discuss the effect of traffic improvements or other mitigation measures on air quality impacts.

The total duration of construction activity is anticipated to be between 5 and 6 weeks (1.25-1.5 months). There will be a localized, short-term increase in vehicle-related emissions from trucks hauling equipment to the site, as well as the equipment itself including; front loading hydraulic excavator, two off road hauling trucks, truck- mounted crane, low ground pressure bulldozer, and skid steer. This short term increase will have no or minimal effect on air quality and carbon monoxide levels in this rural landscape.

- 23. Stationary source air emissions.** Describe the type, sources, quantities and compositions of any emissions from stationary sources of air emissions such as boilers, exhaust stacks or fugitive dust sources. Include any hazardous air pollutants (consult *EAW Guidelines* for a listing) and any greenhouse gases (such as carbon dioxide, methane, nitrous oxide) and ozone-depleting chemicals (chloro-fluorocarbons, hydrofluorocarbons, perfluorocarbons or sulfur hexafluoride). Also describe any proposed pollution prevention techniques and proposed air pollution control devices. Describe the impacts on air quality.

There will be no stationary source air emissions during construction or operation of the proposed project.

- 24. Odors, noise and dust.** Will the project generate odors, noise or dust during construction or during operation? Yes No

If yes, describe sources, characteristics, duration, quantities or intensity and any proposed measures to mitigate adverse impacts. Also identify locations of nearby sensitive receptors and estimate impacts on them. Discuss potential impacts on human health or quality of life. (Note: fugitive dust generated by operations may be discussed at item 23 instead of here.)

Some minimal noise will be generated from heavy machinery during the channel clean-out and construction of the lift station. The construction will likely total less than 4-5 weeks and machinery will only be operated during daylight hours. The additional noise generated will have a minimal impact on the surrounding area. The nearest home site is approximately 800 feet from the watercourse; however the channel cleanout through this area will be completed within one day.

Generation of odor and dust will also be minimal. Excavation will be done in very moist soil and will not create any airborne dust. There will be an increase in truck traffic along a township gravel road during the Downstream Channel Clean-Out stage of the project, thus a small increase in dust would be anticipated for approximately two weeks.

- 25. Nearby resources.** Are any of the following resources on or in proximity to the site?

Archaeological, historical or architectural resources? Yes No

Prime or unique farmlands or land within an agricultural preserve? Yes No

Designated parks, recreation areas or trails? Yes No

Scenic views and vistas? Yes No

Other unique resources? Yes No

If yes, describe the resource and identify any project-related impacts on the resource.

Describe any measures to minimize or avoid adverse impacts.

The project design plans were submitted to the MDNR contract archeologist for review of archeological and historical resources. The MDNR archeologist determined that the proposed project site is limited to terrain previously impacted by ditching, while spoil deposition will be confined to presently or formerly cultivated settings (Attachment F).

Furthermore, archival research indicates there are no historic properties in the immediate vicinity of the project site. This proposed project therefore does not meet the definition of an “undertaking with the potential to affect historic properties for purposes of the National Historic Preservation Act. No further cultural resource review is necessary.

- 26. Visual impacts.** Will the project create adverse visual impacts during construction or operation? Such as glare from intense lights, lights visible in wilderness areas and large visible plumes from cooling towers or exhaust stacks? Yes No

If yes, explain.

As all the work will take place during daylight hours, no visual impacts due to lighting are anticipated.

- 27. Compatibility with plans and land use regulations.** Is the project subject to an adopted local comprehensive plan, land use plan or regulation, or other applicable land use, water, or resource management plan of a local, regional, state or federal agency? Yes No. If yes, describe the plan, discuss its compatibility with the project and explain how any conflicts will be resolved. If no, explain.

The management objective to improve waterfowl habitat on Upper Lightning Lake is consistent with the MDNR Shallow Lakes Program Plan and the MDNR Long Range Duck Recovery Plan. Upper Lightning Lake is also a priority shallow lake as identified by Ducks Unlimited under their “Living Lakes Initiative”. The goal to improve water quality in Upper Lightning Lake is consistent with the Otter Tail County Local Water Management Plan priority goal of “Otter Tail County will maintain or improve the quality of the surface waters within their boundaries”.

- 28. Impact on infrastructure and public services.** Will new or expanded utilities, roads, other infrastructure or public services be required to serve the project? Yes No.

If yes, describe the new or additional infrastructure or services needed. (Note: any infrastructure that is a connected action with respect to the project must be assessed in the EAW; see *EAW Guidelines* for details.)

- 29. Cumulative potential effects.** Minnesota Rule part 4410.1700, subpart 7, item B requires that the RGU consider the "cumulative potential effects of related or anticipated future projects" when determining the need for an environmental impact statement.

Identify any past, present or reasonably foreseeable future projects that may interact with the project described in this EAW in such a way as to cause cumulative potential effects. (Such future projects would be those that are actually planned or for which a basis of expectation has been laid.)

There are no future projects planned for Upper Lightning Lake or in the public watercourse downstream of the lake. A similar project was completed by the MDNR Section of Wildlife approximately 2.0 miles downstream on Denton Slough in the fall of 2011. The project involved the construction of a variable crest water control structure and cleanout of the downstream public watercourse. The objective of the project was to improve waterfowl habitat, improve water quality, and reduce flood damage to public roadways and private property. Denton Slough was completely dewatered by gravity during the 2012 growing season and allowed to return to the normal water level in 2013. Waterfowl habitat and water clarity were greatly improved on Denton Slough. There was also a high velocity fish barrier

installed in the watercourse approximately 1.5 miles downstream of Denton Slough in 2007. The objective of the barrier is to prevent fish from migrating into upstream shallow lakes and wetlands following drawdowns and habitat restorations.

Describe the nature of the cumulative potential effects and summarize any other available information relevant to determining whether there is potential for significant environmental effects due to these cumulative effects (*or discuss each cumulative potential effect under appropriate item(s) elsewhere on this form*).

The proposed project is a continuation of habitat improvements and reduction of flood damage in a number of shallow lakes and wetlands within this highly altered watershed and target area for restoration efforts. The cumulative impact of the projects is intended to complement and facilitate each other to improve waterfowl habitat and water quality. Overall, impacts are expected to be minimal and temporary; long term benefits are expected from these projects. Upper Lightning Lake, the unnamed wetland basin on the Kube-Swift WMA, and Denton Slough can provide significant flood storage in the middle timing zone for flood flow contribution in the Bois de Sioux River watershed when managed at their normal run out elevations. These basins would provide approximately 1,728 acre-feet of storage during a ten year, 24-hour Type II rainfall event. Temporary drawdowns on Upper Lightning Lake and Denton Slough to improve wetland wildlife habitat would also provide additional storage capacity. The short term increase in sediment during the clean out of the watercourse is mitigated by the long term improvements to waterfowl habitat and water quality in over 900 acres of shallow lake and wetland habitat.

- 30. Other potential environmental impacts.** If the project may cause any adverse environmental impacts not addressed by items 1 to 28, identify and discuss them here, along with any proposed mitigation.

There are no adverse environmental impacts that have not been addressed in Items 1-28.

- 31. Summary of issues.** *Do not complete this section if the EAW is being done for EIS scoping; instead, address relevant issues in the draft Scoping Decision document, which must accompany the EAW.*

List any impacts and issues identified above that may require further investigation before the project is begun. Discuss any alternatives or mitigative measures that have been or may be considered for these impacts and issues, including those that have been or may be ordered as permit conditions.

There are no additional impacts or issues identified in the previous sections that require further investigation. All applicable permits and approvals identified in Section 8 will be secured prior to awarding a contract for the construction of the project.

The MDNR Section of Wildlife will also complete the Wildlife Lake Designation process as described in Minnesota Statute 97A.101 to gain the legal authority to manage water levels on Upper Lightning Lake to improve wildlife habitat.

RGU CERTIFICATION. *(The Environmental Quality Board will only accept **SIGNED** Environmental Assessment Worksheets for public notice in the EQB Monitor.)*

I hereby certify that:

- The information contained in this document is accurate and complete to the best of my knowledge.
- The EAW describes the complete project; there are no other projects, stages or components other than those described in this document, which are related to the project as connected actions or phased actions, as defined at Minnesota Rules, parts 4410.0200, subparts 9b and 60, respectively.
- Copies of this EAW are being sent to the entire EQB distribution list.

Signature

Date: June 30, 2014

A handwritten signature in black ink, appearing to read "Ji Taulby". The signature is written in a cursive style with a large initial "J".

Title: Planner Principal

Environmental Assessment Worksheet was prepared by the staff of the Environmental Quality Board at the Minnesota Department of Administration, Office of Geographic and Demographic Analysis. For additional information, worksheets or for *EAW Guidelines*, contact: Environmental Quality Board, 658 Cedar St., St. Paul, MN 55155, 651-201-2492, or <http://www.eqb.state.mn.us>

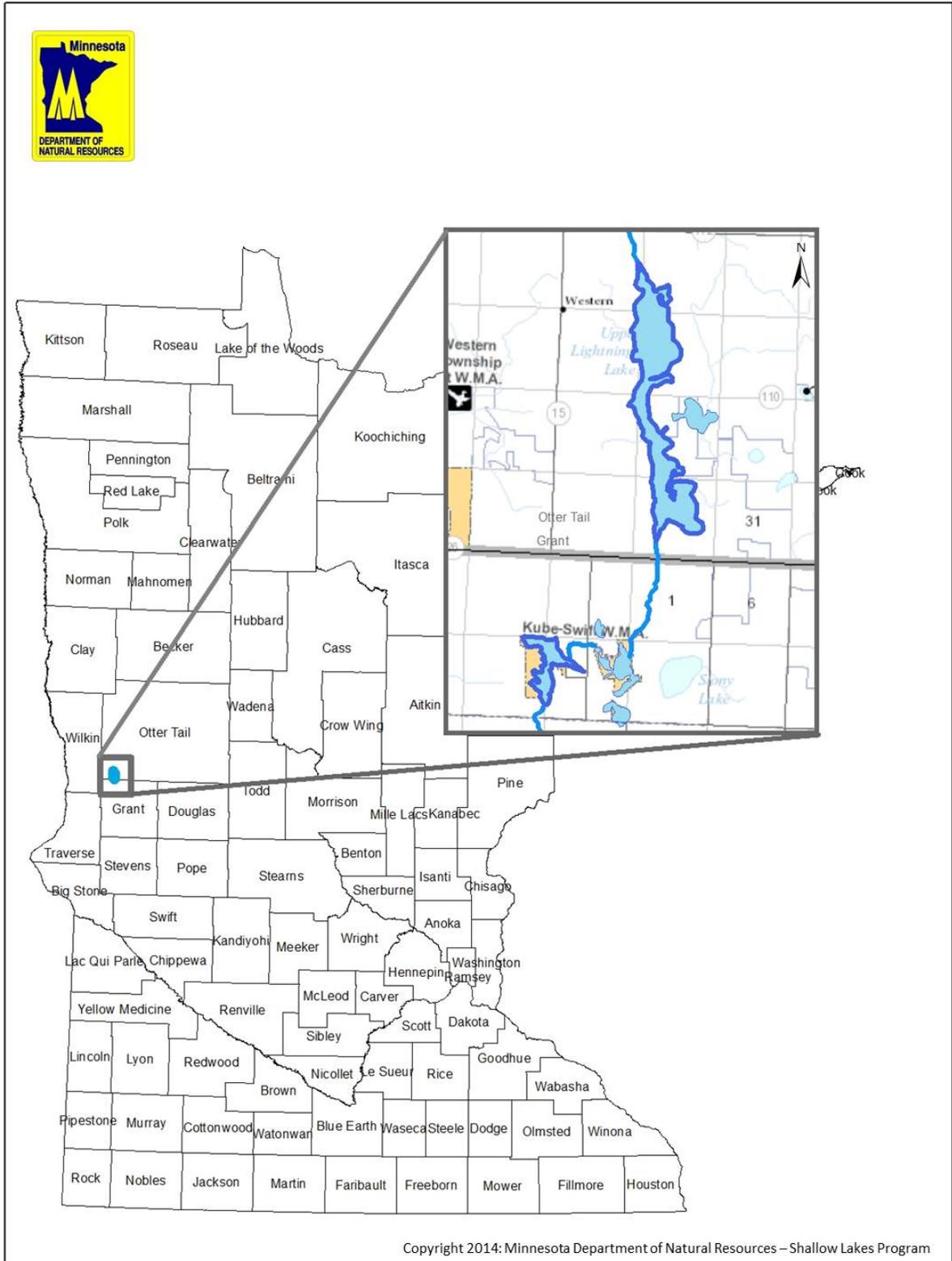


Figure 1. General location of the project site.

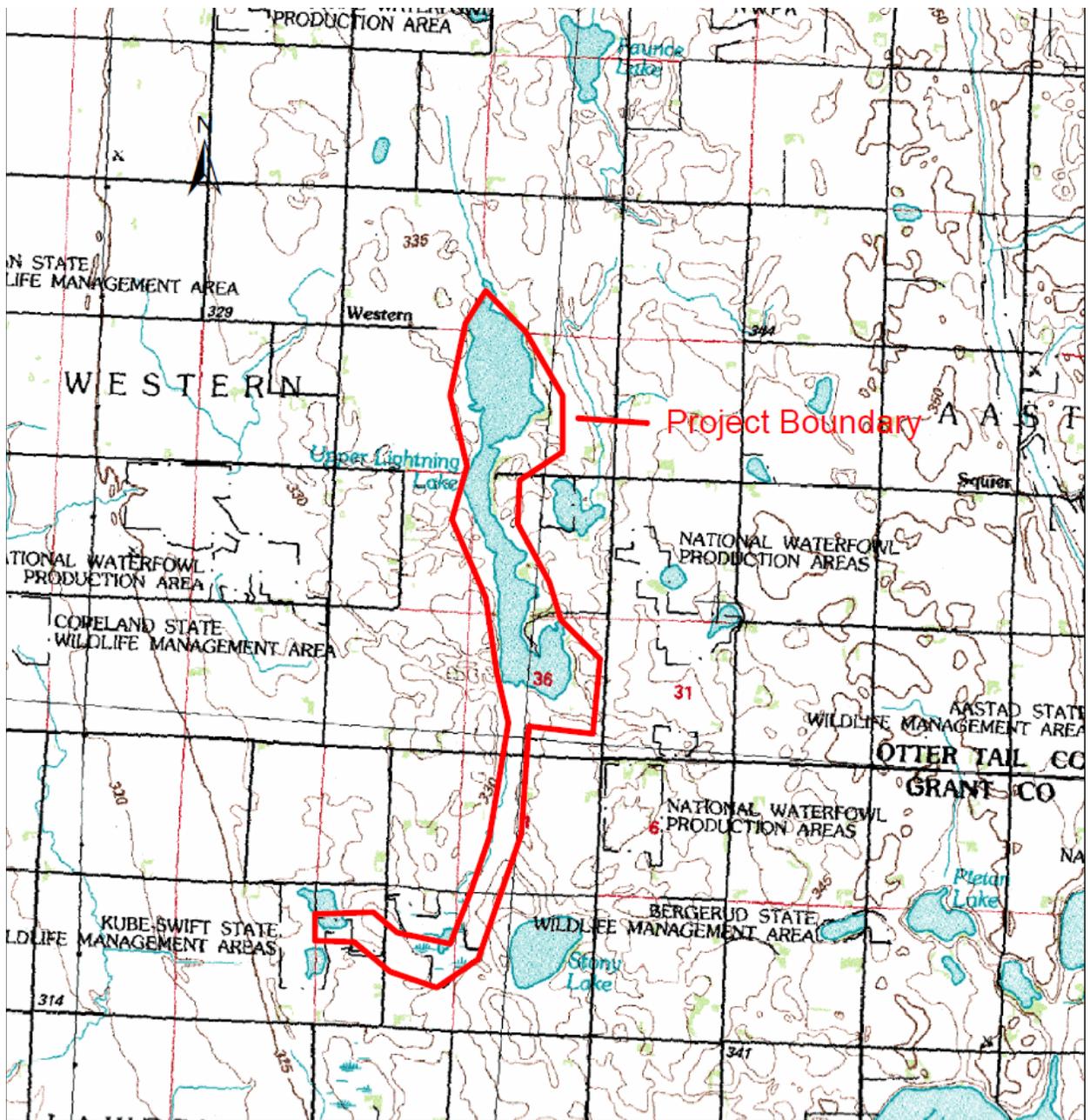


Figure 2. U.S. Geological Survey, 1:100,000 scale map indicating project boundaries.

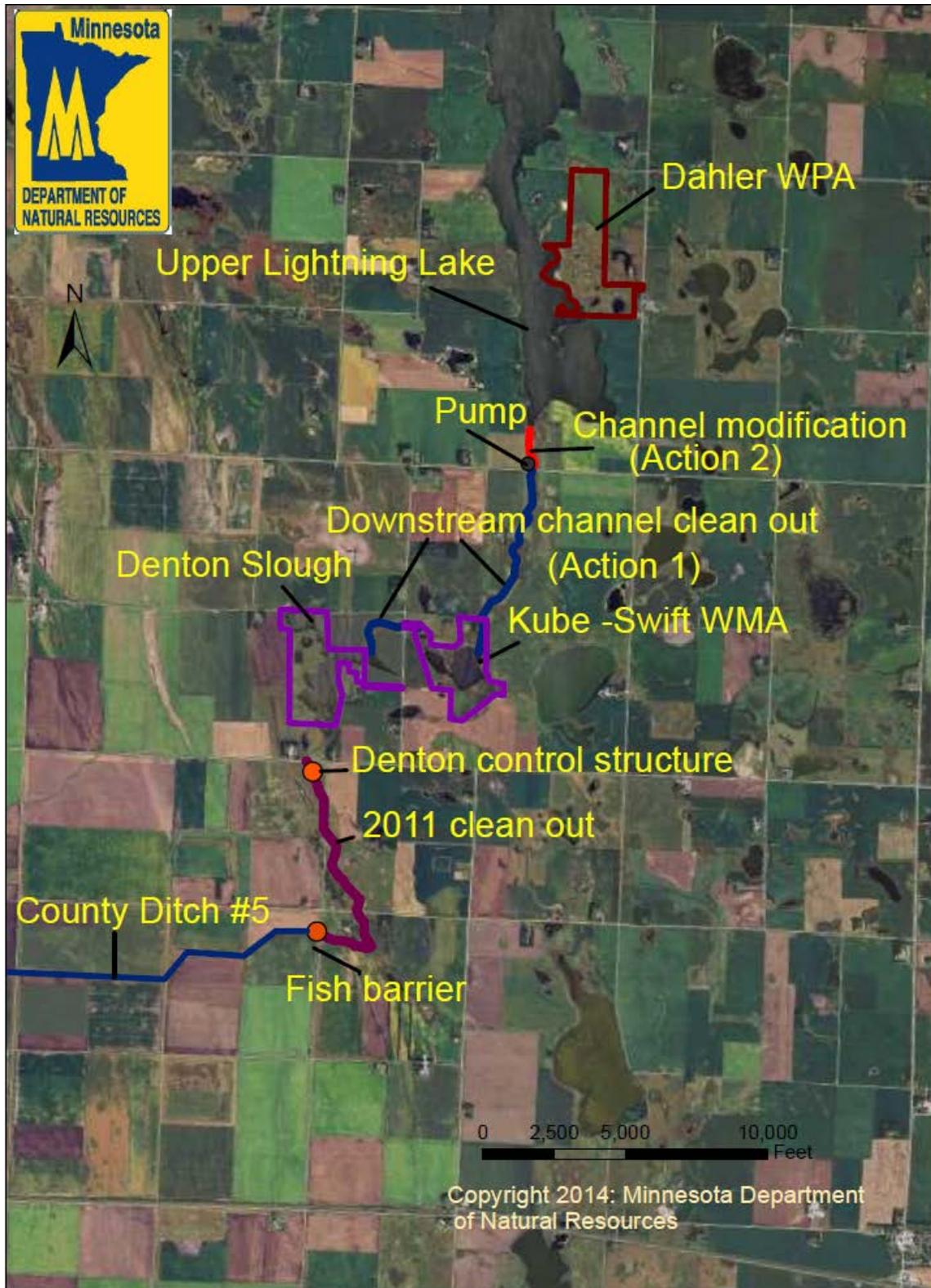


Figure 3. Project site overview.

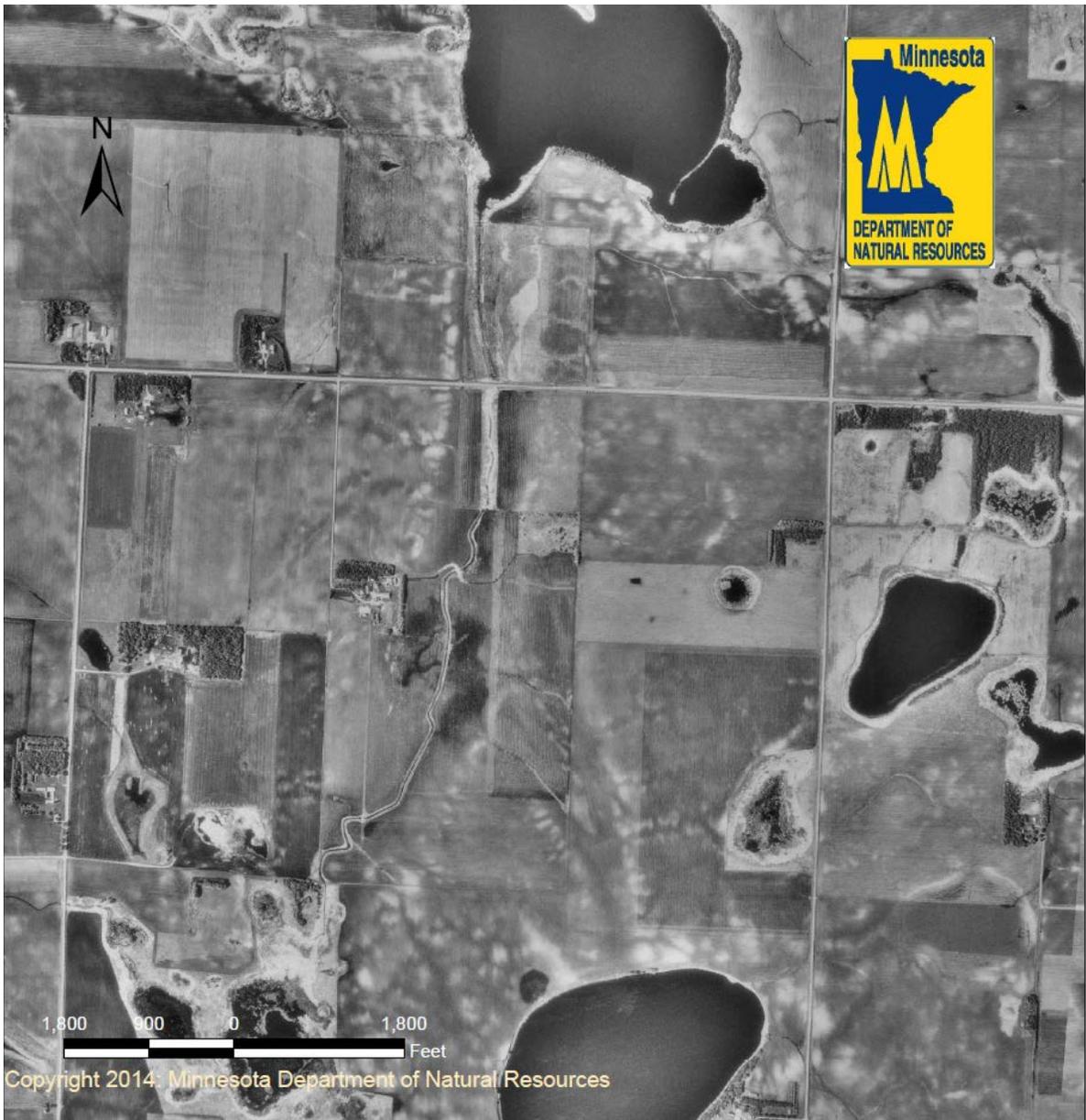


Figure 4. Aerial view of downstream channel in 1991.



Figure 5. Aerial view of downstream channel in 2010.

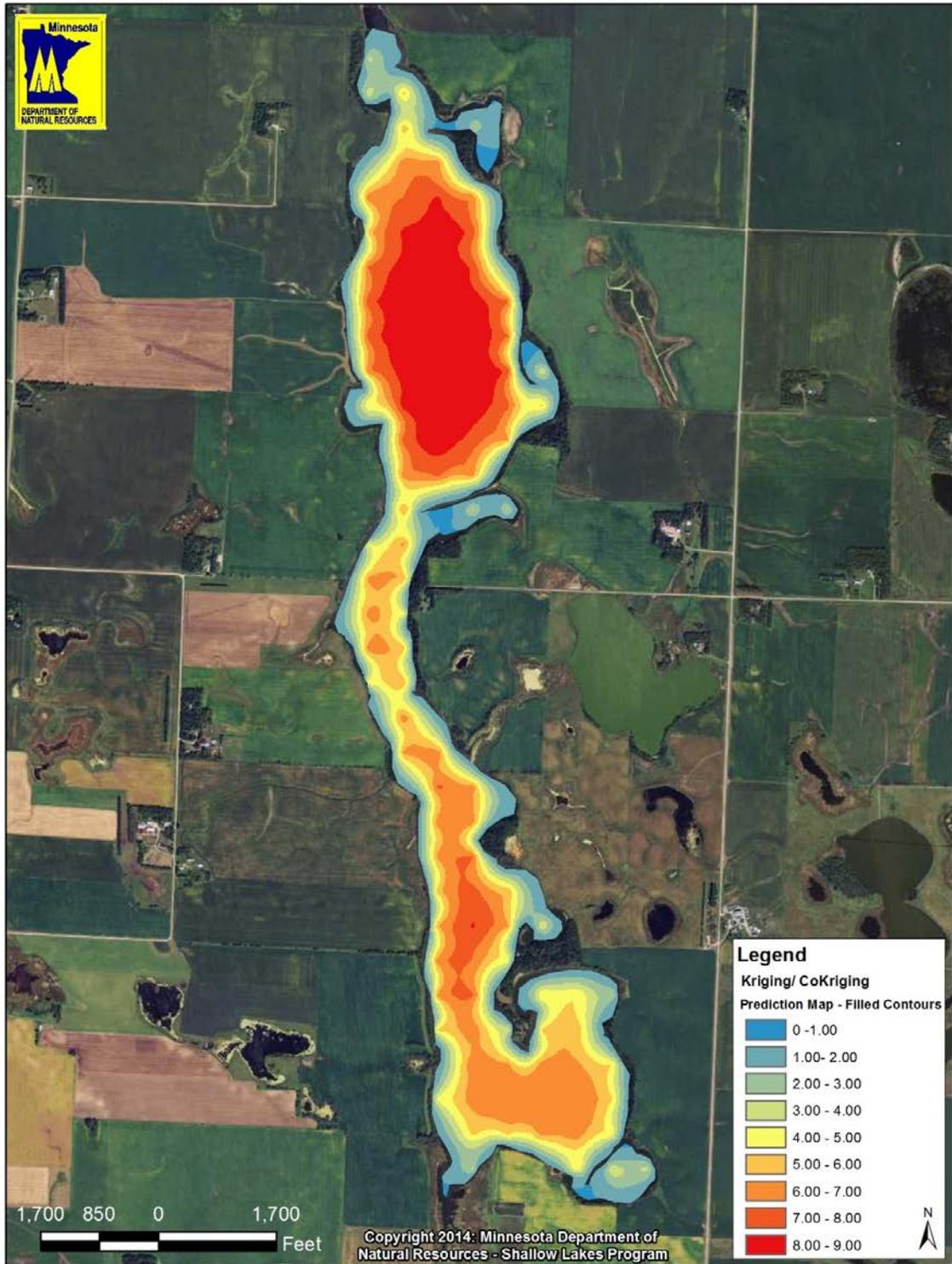


Figure 6. Depth contours of Upper Lightning Lake in 2013.